1.0   TITLE OF EFFORT: Constellation GFE Projects and CFE Quality Support (WBS 1.5.6)

2.0   TASK DESCRIPTION:
Coordinate and conduct S&MA activities for authorized Constellation Program quality and flight equipment projects (which may include GFE, CFE, and payloads), provide and discuss S&MA topics and issues, and participate in all S&MA activities associated with the GFE lifecycle as defined in EA-WI-023 and EA-WI-025. Provide support to on-orbit operations including integrated operations assessments. Review proposals and change requests for system designs and design modifications in order to assess S&MA impacts and identify S&MA issues for GFE assets.

2.1   STATEMENT OF WORK REFERENCE: Section 5.0 - Program Support, Section 6.0 - JSC Project Support, Section 8.0 - Advanced Programs, Assurance Methodologies, and Special Processes

2.2   Constellation Program Support (WBS 1.5.6.1)

2.2.1   Constellation Program GFE Safety and Reliability (WBS 1.5.6.x)
Perform flight safety, reliability, and mission assurance for GFE. Provide safety and Mission Assurance for GFE payloads. Participate in development and modification of hardware and software to identify and discuss hardware criticality assessments and define S&MA requirements. identify design problems and provide design solutions or improvements.

a. Participate in design reviews and program boards (as required), review provided data and documentation, and provide RID'S on S&MA-related issues and deficiencies.
b. Identify potential hazards, evaluate proposed hazard controls, and evaluate methods for verification of hazard controls.
c. Identify potential critical items list failure modes, causes, effects, methods of verification, and acceptance rationale.
d. Track and provide status on requirements verification, system qualification, and design certification activities.
e. Identify missing or non-compliant S&MA requirements as well as performance requirements that cannot be verified.
f. Conduct S&MA assessments, prepare presentations, and present results of those assessments to S&MA management, project management, and the Constellation Program for discussion.
g. Assure that hardware operational uses, operating limits, hazard controls, and fault tolerance are verified prior to flight.
h. Participate in problem/anomaly investigations during all phases of a project to assure that the problems are appropriately documented; adequate and appropriate investigation is planned and conducted; closure rationale is acceptable and complete; and visibility of the problem/anornaly is elevated to the appropriate S&MA management level.
i. Support operational use of hardware and software.

2.2.2   Constellation Program Software Assurance (WBS 1.5.6.x)
Provide Software Assurance, including software safety, software reliability, software quality engineering, software quality assurance, and software verification and validation, for the Constellation Program.

a. Ensure the conformance of software lifecycle processes and products to requirements, standards, and procedures.
b. Define Software Assurance requirements.

c. Perform process and product activities throughout the life cycle to provide objective insight into the maturity and quality of the software processes and products.
d. Ensure that the software safety requirements are clearly identified, documented, traced and controlled throughout the software lifecycle
e. Perform analysis of the consistency, completeness, correctness and testability of software safety requirements.
f. Ensure the testing of software safety critical components are sufficiently implemented and that applicable controls are in place to verify all safety conditions
g. Conduct analysis of proposed changes on system safety
h. Evaluate the reliability of the software products created throughout the life cycle
i. Ensure that the software being developed or maintained satisfies the functional and performance requirements
j. Ensure that each phase of the development process yields the right software products
k. Participate in major milestone reviews and certification/acceptance of the software.

2.2.3 Constellation Program Quality Engineering (QE) (WBS 1.5.6.x)
Perform Quality Engineering (QE) functions at Program-level subcontractors,

a. Perform program directed analysis of quality assurance related requirements.
b. Perform Change Requests analysis for Constellation related directives, requirements per Program Office Direction.
c. Develop program related directives, requirements, and change requests dealing with quality and provide tracking and support to program representatives.
d. Perform facility certifications and surveillance as directed by the Program Office
e. Perform Program directed investigations of anomalies

2.2.4 Constellation Program GFE and CFE Procurement Quality Assurance (WBS 1.5.6.x)
Perform PQA functions at contractors and subcontractors:

a. Assure that Constellation Program, CEV Project, Lunar Lander Project and miscellaneous Constellation related sub-project contractors and vendors have a quality assurance program, and that it's adequately addressed in the procurement cycle. A Supplier Scorecard will be kept for NASA Contractors and for Suppliers of Criticality 1, 1 R, 1 S, 2, and 2R hardware. The Supplier Scorecard will track key attributes for Constellation products such as quality performance, delivery performance, cost of poor quality (scrap, rework, warranty, concession, returns, etc.), and corrective action attributes.
b. Where identified, perform Pre-Award surveys of suppliers.
c. Review purchase orders to verify proper inclusion of quality requirements and supplier qualifications.
d. Review purchase orders to determine if Government Source Inspection (GSI) is required.
e. Review purchase orders to determine appropriate quality instructions.
f. Assure consistency of contractor and subcontractor activities with Federal Acquisition Regulation (FAR) requirements.
g. Prepare DRAFT DCMA letters of delegation
h. Manage working agreements and Letters of Delegation (LOD) in accordance with NPR 8735.2 for product assurance actions performed by support contractors or the Defense Contract Management Agency (DCMA), including process flow information and the coordination of QA issues and concerns between suppliers and Agency management.
i. Reconcile existing DCMA Quality Leading Indicators (QLI) reports with product requirements.

2.2.5 Constellation Program Audits (WBS 1.5.6.x)

Participate in NASA-sponsored audits in accordance with the requirements of CxP 70059, SR&QA Requirements.

a. Participate in joint audits with other NASA Centers or government entities to verify S&MA requirements implementation at NASA contractors, subcontractors, and vendors.
b. Perform independent surveillance and periodic audits on Center, contractor and subcontractor S&MA products and processes.
c. Provide audit expertise to advise Constellation Technical Management Representatives (TMR's) on audit development planning.

2.3 Lunar Landing Module (LLM) Project Support (WBS 1.5.6.2)
The following series of tasks are incorporated as "place holders" for developing future work packages for the Lunar Landing Module project. No activities are currently active.

2.3.1 **LLM Project GFE Safety and Reliability** – Reserved for future work.

2.3.2 **LLM Project GFE Quality Engineering** - Reserved for future work.

2.3.4 **LLM Project GFE Software Assurance** - Reserved for future work.

2.3.5 **LLM Project CFE and GFE Audits** - Reserved for future work.

2.3.6 **LLM CFE Quality Engineering** - Reserved for future work.

2.4 Constellation Portable Equipment (Cx PE) (WBS 1.5.6.5)
The following series of tasks are incorporated as "place holders" for developing future work packages for the Constellation Portable Equipment project. No activities are currently active.

2.4.1 **Cx PE Project GFE Safety and Reliability** - Reserved for future work.

2.4.2 **Cx PE Project GFE Quality Assurance** - Reserved for future work.

2.4.3 **Cx PE Project GFE Quality Engineering** - Reserved for future work.

2.4.4 **Cx PE Project GFE Software Assurance** - Reserved for future work.

2.5 DELIVERABLES
Requirements Verification/Certification Status
SDF Assessments
S&MA Assessments and Presentations
Code assessments
RIDS
List of Auditors
Audit Reports
Master Audit Schedule
Technical and metric analysis
Subcontractor performance reports
Draft letter of delegations

3.0 PERIOD OF PERFORMANCE: October 1 2008 - April 30, 2009

4.0 ESTIMATED COSTS:

Contractor may provide travel, training, materials, and other non-labor resources as necessary to support task order requirements. Training may include selected professional discipline-based or spaceflight-based conferences with approval of the TMR.